To Build or not to Build? That is the Question: Conditions of Possibility in Translation for Design

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ABSTRACT
There are many qualitative approaches that aim to improve information systems design, particularly for HCI. However, there are translation issues which make IS design difficult, particularly for complex and socially sensitive settings. This research began with the theoretical lens of user centered design (UCD) and critically reflected on the trajectory of interactions involved translating across the research setting, the researcher and the technologists. A multi-theoretical and methodological perspective was chosen, drawing on principles and techniques from UCD, customer trajectory analysis (CTA), distributed cognition (Dcog) theory, and various practice theories with the objective of including as a condition of possibility, the ability to recognise when it is not necessary to build a technology. BreastScreen Tasmania was chosen as a suitably sensitive, complex social domain for implementing various research design methods into a setting, to explore the boundaries of translation issues and to develop a meta-framework in which IS research and design can fruitfully interact with a setting and possibly choose to refrain from building something technical.

Categories and Subject Descriptors
H.1.2 [**Information Systems**]: User/Machine systems– *human factors, human information processing*.

General Terms
Design, Human Factors, Theory.

Keywords
Information Systems Design, Human Centred computing, Qualitative research methods.

1. INTRODUCTION
Qualitative approaches are currently accepted and used in both academic and business domains for eliciting information for the design, development and implementation of information systems artefacts that take into account human factors and the social context of work [1, 2]. These approaches have been proven to improve technology adoption and use by variously influencing design in a way that increases users' satisfaction, trust and ease of use with particular technologies/systems [3].

While these successes are laudable, there remains an underlying concern amongst many researchers within the IS discipline using these approaches about the process of translation that occurs from the rich insights generated to the systems that are finally built [4].

The translation of sociological observations from the research setting to a textual or verbal description is problematic because insights can be prioritised or left out. This 'censorship' can be due to the researcher's (often unconscious) subjectivity (and self-reflexivity is difficult); or to (conscious) pragmatic decisions made in response to politically driven constraints of having to articulate the dominant perspectives within a setting, or pressure to sacrifice rigour of sociological understanding for timely deliverables required by design or business.

Also, there is a conundrum posed by the trajectory of interactions between different cultures/communities of practice [5], all with different, often dissonant underlying assumptions and values. The trajectory of interactions (from setting to researcher to technologist) requires researchers engage in an at best iterative process of translating rich insights from the field or setting for technologists who want those insights in terms of requirements they can use to build something.

Sophisticated qualitative approaches have been developed to address the thread of implicit techno-centrism which biases interaction outcomes towards closing down problem descriptions into forms amenable to a technology solution [4, 6, 7]. They aim to capture richer, deeper insights into the complex and socially sensitive factors in a domain and (among other things) to provide insights that focus on individual users [3], encompass the socially situated and distributed nature of human decision making [4, 6] and encompass future perspectives of individuals [7].

This research began with the theoretical approach of user centered design (UCD) and critically reflected on the trajectory of interactions from setting to researcher, and researcher insights to technology design requirements, and how that results in an imperative to build something that will either support or change existing practice and routines in an environment. The aim is to develop a meta-framework in which IS researchers and designers can fruitfully interact with a rich, complex and social domain (RCSD) and include a condition of possibility that the research outcomes can identify when it is not necessary (or even detrimental) to design or build a technology.

The research deliberately approached the research setting from a multi-theoretical and methodological perspective, drawing on principles and techniques from UCD user centred design [3], distributed cognition theory (Dcog) [6], and Customer Trajectory Analysis (CTA) [7].

BreastScreen Tasmania was chosen as a domain suitable for implementing various research design methods into a sensitive, complex social setting, explore the boundaries of translation

issues and to develop a meta-framework for IS research that disables default techno-centrism and which allows for the possibility that a technology introduction may do more harm than good.

2. POINTS OF TENSION: QUALITATIVE RESEARCH AND INFORMATION SYSTEMS DESIGN

Qualitative research approaches have been shown to deliver financial and user-related benefits when deployed to contribute to information technology designs [2, 3]. This is particularly so in situations where technology is being designed and implemented in rich, complex, social domains (RCSDs).

At the broadest level, qualitative IS research approaches are clearly many and varied [2, 8], and draw on the social sciences of sociology, psychology, cognitive science and anthropology. Philosophical insights and methodological processes and techniques from these social sciences are applied from an informational perspective to draw out the complex and dynamic interplay between social, cultural, political and technical factors available for observation and analysis.

Problems of translation from one research discipline to another can occur when transferring concepts and techniques into new disciplines. DeSantis & Ugarriza [9] point out that the transfer of research methods from social science disciplines into other disciplines in order to study specific phenomena often results in a blending of distinct research methods, which compromises methodological rigor in data analysis and theory generation. Moore et al. consider that the growing use of social science constructs in public health invites reflection on how public health researchers translate, that is, appropriate and reshape, constructs from the social sciences [10].

In deploying various qualitative research frameworks, IS researchers tend to focus on the role of information, and particularly the processes by which it flows. Qualitative IS research is then in a position to reflect on and articulate the implications of the insights generated for the way in which technology might be used to enhance or even inhibit information flow (ie. sometimes there are things people don't need to know, to prevent information overload).

These research approaches aim to support 'better' IS/IT artefact designs that can reliably replicate and support work practices and accommodate the nuances of daily social experience. General examples include ethnographic approaches such as Star's work focussing on technology [11]; Susan Gasson's work on socially situated cognition [12] and her framework for human-centered design that aims to reduce technology bias in IS design [4]; Wales, O'Neill and Mirmalek's work on customer trajectories in the framework of human centered computing [7]; Hollan, Hutchins and Kirsh's distributed cognition (Dcog) approach [6]; User Centered Design (UCD) and its adaptation, the Discovery UCD methodology [3].

Unsurprisingly, this diversity of different qualitative approaches to design for social settings (particularly for RCSDs) has led to numerous debates within the discipline on which are the best approaches, or if it is possible to have a universally agreed best approach [8].

However, once the choice of approach is made from the "theoretic grab bag" of qualitative approaches available for use [8: 263], another issue remains for IS researchers (particularly within HCI and CSCW communities). This is the largely unaddressed problem of how to meaningfully translate complex descriptions and insights of specific social interactions into technological design paradigms [13]. This is because design paradigms are underpinned by technological assumptions about the benefits of generalisability, standardisation, verification and the benefits of simplification, and qualitative research approaches do not uncritically share these assumptions.

This research conceptualises the Information Systems discipline as primarily attending to formal information processes and systems with digital technology endpoints. The techno-centrism reflected in prioritising formal information networks is in tension with IS researchers' attempts to capture characteristics and qualities of informal information processes within a research setting and then incorporate insights and perspectives related to the psycho-social, political, cultural and material environment into technology design.

This tension is reflected in a growing recognition that implicit techno-centrism inherent within IS design processes often tend to relegate qualitatively derived rich insights to mere adjuncts of conventional usability testing and marginalise opportunities to open up dialogue on new ways of thinking and designing [4]. This particular failure in translation is partly because IS design activities are uncritically framed as problems with technological solutions [2, 14] and partly because business/career imperatives encourage and/or reward designers for feature and functional complexity whether users require it or not.

In addition, the problems identified by Hughes et. al. [14] associated with co-opting or adapting sociological perspectives and techniques for the study of technology, industry and organisations have not changed. Problems of scale, budget and time constraints and the pragmatic difficulties of translating research insights for systems developers are still being discussed [2]. It also appears the moral and political dimensions of incorporating ethnographic techniques identified by Hughes [14] have been of less concern to the IS discipline than the economic considerations.

The vexed questions of translating rich insights of informal information systems in a given domain, and of implicit techno-centricism in all IS discipline activities raise fundamental questions about how the IS discipline approaches the generation and use of rich user-centred insights, how it treats formal and informal information systems, and how it weights the insights garnered.

2.1 Rich, Complex, Social Domains (RCSDs)

Increasingly qualitative research projects in information systems space are drawing on assumptions that reality is socially constituted, and that acquiring an adequate understanding of reality for technology related decisions relies on investigating these RCSDs from within conceptual frameworks that are sensitive to the socio-cultural, political and dynamic aspects of how people and their artefacts interact [15].

In line with this, RCSDs are often appropriately characterised as 'wicked' [16]: where a situation is ill structured, with vague

boundaries, multiple perspectives and interrelated problems. These domains present the kind of problems that are systemic and require a systemic solution [4, 12].

However, while the problems of designing research frameworks for obviously complex social situations are often acknowledged in the literature [4, 17], it is possible to argue that all social situations are wicked in Rittel's sense. This is because even situations that are considered relatively small scale and well-bounded can only be described as such on the basis of simplifying assumptions. Such assumptions always do violence to an understanding of what is happening, because the very process of segmenting facets of complexity into independent or causally related factors and prioritising them is simultaneously a process of decisions on what is not a factor and not relevant.

Various ways of thinking have been promoted as a way forward in dealing with the apparently intractable problems for the (information systems/HCI/CSCW/...) in dealing with (social) complexity. One is to dismiss the notion of qualitative ethnography as a panacea for 'wicked' problems and use ethnography as a technique for identifying key social insights that should and can be inserted into the technological design enterprise [14]; another is to recognise that no one theory is sufficient and use the one best suited to the research purpose, keeping conscious of its assumptions and priorities [8].

Using a technique approach requires methodological compromises to accommodate ethnography into a systems development paradigm [14] and is satisficed with incremental changes to design rather than the higher ideal of transformative or comprehensive impact [17]. The other approach aims to ensure theories are used appropriately in a given context (appropriate meaning that the research output of descriptions provided for the designer will be able to inform design), and the use of the theories explained comprehensively to enable academic discourse across approaches [8].

However, IS research responses to complexity remain clearly located within the techno-centric paradigm that assumes the purpose of the research is to have an impact on something technological to be designed and implemented. Should we explore more fully the moral and ethical implications of aspiring to the role of independent advocate for the user when the ethnographer is also the designer's agent and effective communication with the designer is a key recommendation of our research framework [17]?

A major conundrum for information focused research is how to deal with the information or knowledge that is embedded in the heads of people, the things they use and the environment in which they interact with other people and things. Tsoukas [18] argues that we cannot operationalise this tacit knowledge but we can find new ways of talking, fresh forms of interacting and novel ways of distinguishing and connecting. Tacit knowledge cannot be "captured", "translated", or "converted" but only displayed and manifested, in what we do. New knowledge comes about not when the tacit becomes explicit, but when our skilled performance is punctuated in new ways through social interaction. At the level of thinking about research frameworks, this implies that adopting multiple lenses for understanding a context will produce displays of tacit, socially embedded information in action that is not possible to capture by using one theory or method.

This research advocates adopting multiple theoretical lenses and using them self-reflectively in order to mitigate the problems caused within RCSDs when decisions are validated on the basis of frameworks for thinking that obscure perspectives not important to a particular theoretical framework, or which do not support the techno-centric paradigm in which IS currently operates. In particular, the research approach is being developed to find a vocabulary for interactions in complex and essentially social contexts.

Sensitive and complex settings require high levels of intersubjectivity, from researchers, and particularly from technologically oriented actors in a setting who usually have power to overrule perspectives and concerns from socially-oriented actors during the process of translating the purposes and goals of an organisation into an information system design [4]. This research aims to provide an approach that aids the translation process and, critically, that gives sufficient weight to socially oriented perspectives, such that it is possible to overrule technological perspectives and concerns that oppose them.

2.2 The Substantive Domain: BreastScreen Tasmania

BreastScreen Tasmania was chosen as a domain suitable for implementing various research design methods into a sensitive, complex social setting and explore the boundaries of translation issues and thus develop a meta-framework for IS research. This will allow assessment of the impact of the research approach implemented on the setting, and also the ability of the approach to disable default techno-centrism and allow for the possibility that a technology intervention or modification may do more harm than good.

BreastScreen Tasmania (BST) is the dominant unit within the Tasmanian Cancer Screening and Control Service which operates within the state Public and Environmental Health Service. Public health is philosophically aligned with a rational, scientific positivist paradigm and its activities are justified and evaluated at the level of evidence based on scientific studies (double-blind trials, population level) and collecting statistics guide decisions on policy recommendations, legislation recommendations and interventions. It deals with the tension of affirming individual freedom of actions and implementing or encouraging public policy which involves constraining individual actions as a responsibility for public benefit. It deals with the tension of acting on the basis of quantifiable benefit, when benefits for most public health interventions are delayed by decades, and can be attributed to complex, multiple causes, and are often not quantifiable.

Breast cancer screening is government funded and participation is voluntary. Mammograms are known by to be very painful and BST must balance encouraging participation by managing the quality and type of information and other care given to participants with an imperative to screen as many women in the target population as possible (which means less time for personalised care). The purpose of BST's activities is prevention of large breast carcinomas via screening to identify precancerous cells or small cancers.

Of further interest to this research is that BST is an organisational unit in the health care sector which has characteristics which require interactions between people in multiple and complex sets

of relationships at variable levels (individual, organisation and inter-organisation). In the case of medical and allied health professionals, this includes delicate social relationships that need careful management. These characteristics include:

1. BST's activities are intrinsically social, yet are measured and evaluated within a positivist science paradigm according to strict standards for accreditation purposes;

2. BST has interactions with several professions within the health care system which act to constrain and facilitate its operations;

3. BST has interactions at different political levels (national, state, region);

4. BST has a culture of caring for the individual (feelings and beliefs) and creating, maintaining a healing relationship and then empowering and releasing clients from that relationship to manage their own care and interaction with other health care providers;

5. BST uses technology, but keeps the focus on people, and staff members occasionally subvert the technology for the sake of the social outcomes to which they are committed;

6. BST keeps the focus on people, but that is not allowed to compromise their medico-legal responsibilities in data collection and accreditation standards.

In this context it is considered appropriate to use a range of methods to elicit a rich and detailed description of the setting. The researchers' involvement in the Smart Internet Technology CRC provided the opportunity for utilising User Centred Design and Discovery UCD, and also opportunities for developing rapport and skills in translation through attending in-house conferences, and potentially engaging in a translation process with technologists within the CRC.

Distributed cognition is a theoretical lens that provides a framework for data collection and analysis and a suite of techniques for moving beyond the individual in identifying how people think and act together in prosecuting the organisation's purposes. It also enables identifying and describing evidence of tacit knowledge and mental models [19].

Customer trajectory analysis is a technique developed within the broad domain of Human Centred Computing [7] which adds a human centred level of analysis of 'customer as participant' which can be used to uncover assumptions of customer perspectives that are embedded in an organisation's policies, practices and technical information systems, particularly the point where actual customer perspectives challenge the organisation view. It is a method that can provide information to allow redrawing organisation boundaries and for identifying emerging customer perspectives which need to be taken into account in order to continue functioning and meeting actual customer needs that the organisation intends to meet.

In conjunction with this, the researchers are also exploring the utility of Wenger's [5] unit of analysis, "community of practice" for exploring activities at the boundaries and peripheries of BST.

3. CONCLUSION

This research is conducted at the nexus of a critical area of tension in IS. Any IS project (research or design) spans several distinct, yet related communities of practice [5]: those observed in the research setting, that of the researcher and of the technologists. The translation issues and implicit bias to technically oriented outcomes are ameliorated, but not dissolved by increasing sophistication of qualitative approaches and richness of insights. Ethnography of technologists may give the researcher greater rapport and skill in translating social insights for technology designers, but issues of researcher subjectivity and implicit bias towards translation and calibration for technology design and implementation remains.

Rich, complex social domains, settings that are socially sensitive require a meta-framework for analysis that has a condition of possibility that a technological end point is not needed. Such a framework would contribute to establishing the integrity of research undertaken and designs recommended. It would also provide a broader conceptualisation where 'information system' clearly refers to more than digital technology information systems and incorporates and calibrates the informal information processes and networks that are not amenable to formalisation, and establishes their role and value within the situation.

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